

Social Network Analysis

SS8®

AIDS LAWFUL INTERCEPT CASES

Social Network Analysis (SNA) is a technique for modeling the communication patterns between individuals in a way that illuminates the structure of the network and the importance of individuals within the network. By visualizing the intercepted communications between individuals and websites as a social network, clear patterns can be uncovered immediately.

SOCIAL NETWORK ANALYSIS OVERVIEW

Social Network Analysis (SNA) is a technique for modeling the communication patterns between individuals in a way that illuminates the structure of the network and the importance of individuals within the network.

By visualizing the intercepted communications between individuals and websites as a social network, clear patterns can be uncovered immediately from within the Intellego application.

The SNA module is accessed in Intellego from the Analysis tab. Running an analysis on a case with multiple intercepts provides critical information about the key players in the network that would not otherwise be apparent browsing through the events themselves.

SOCIAL NETWORK ANALYSIS IN LI CASES

SNA extracts relationships from intercepted communications and displays relationships between key players in an intuitive and interactive way. Investigators are typically buried in volumes of data—SNA helps them put a structure around this data turning it into useful information.

One of the biggest challenges for investigators working on lawful intercept cases is the difficulty in finding relevant, pertinent information among the large volume of irrelevant data. As the volume of Internet communications grows exponentially, investigators need new tools to both understand the patterns and relationships in the intercepted communications and to drill down and isolate individual communications relevant to the case. Intellego's analysis modules help investigators do exactly that by displaying intercepted communications in an intuitive and interactive graphical diagram.

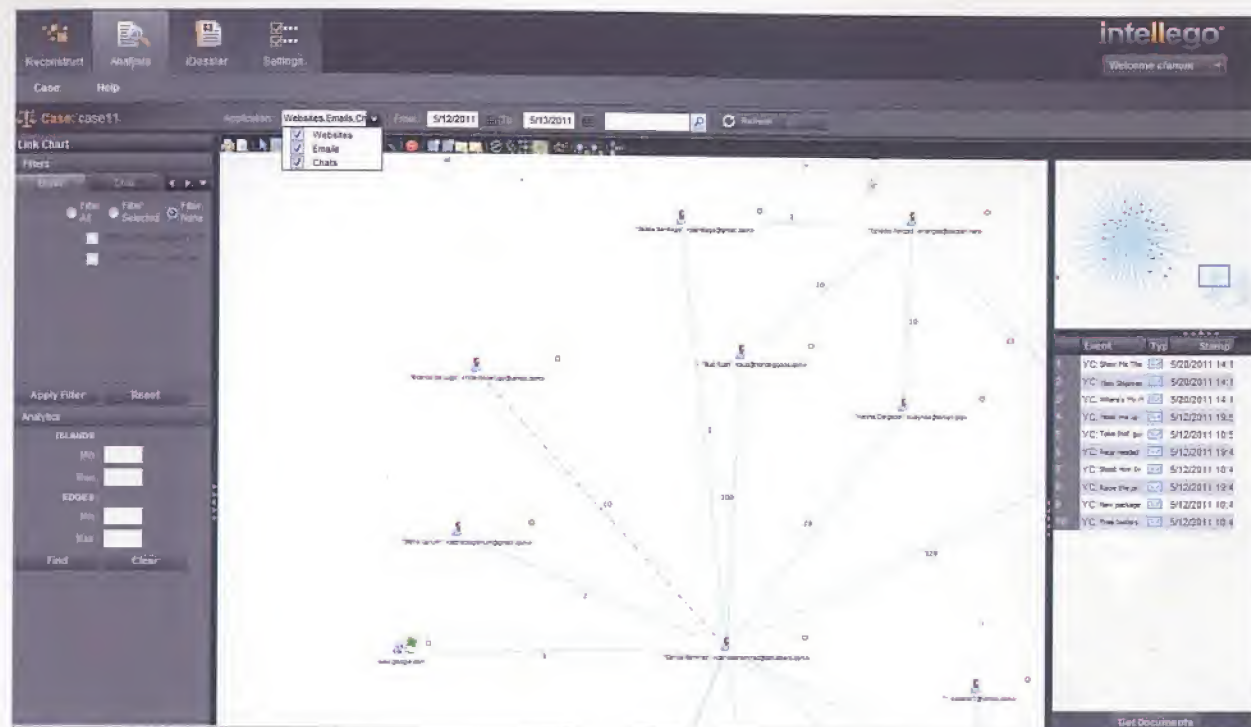


FIGURE 2.0

Social Network Analysis Link Charting Provides Important Insights into the Patterns of Data

SOCIAL NETWORK ANALYSIS METRICS

Once lawfully intercepted communications have been displayed in a social network, Intellego provides a number of analytical tools to assist the user in determining how important certain individuals or groups might be to the structure of the network. Intellego provides the ability to calculate measures of centrality in the network, which provide a score for each node on the basis of its importance from both a **targeting** perspective and a **monitoring** perspective.

The **betweenness** metric measures how often a node lies on the shortest path between two other nodes. This measures how often an individual serves as a conduit of information throughout the network. Individuals with high betweenness scores are likely to have valuable information about the network and are prime targets for monitoring.

The **closeness** metric measures how close an individual node is to the center of the network by calculating who can reach the entire network in the shortest number of connections. The individuals with high closeness scores are key from a targeting perspective as removing them from the network is likely to break the network into isolated groups, thus preventing the network from communicating and operating as designed. An individual with a high closeness score is more likely to be a decision maker, or an operational leader of the network, as they are the cohesive piece that holds the network together.

Intellego's SNA module also calculates **Eigenvector** values for each node in the network, which gives high scores to nodes with strong connections to other nodes with high scores.

Individuals with high eigenvector scores are key because they are very highly linked to other important nodes within the network. Those individuals are likely to be key decision makers in the network due to their tight connections to other nodes placed highly in the network.

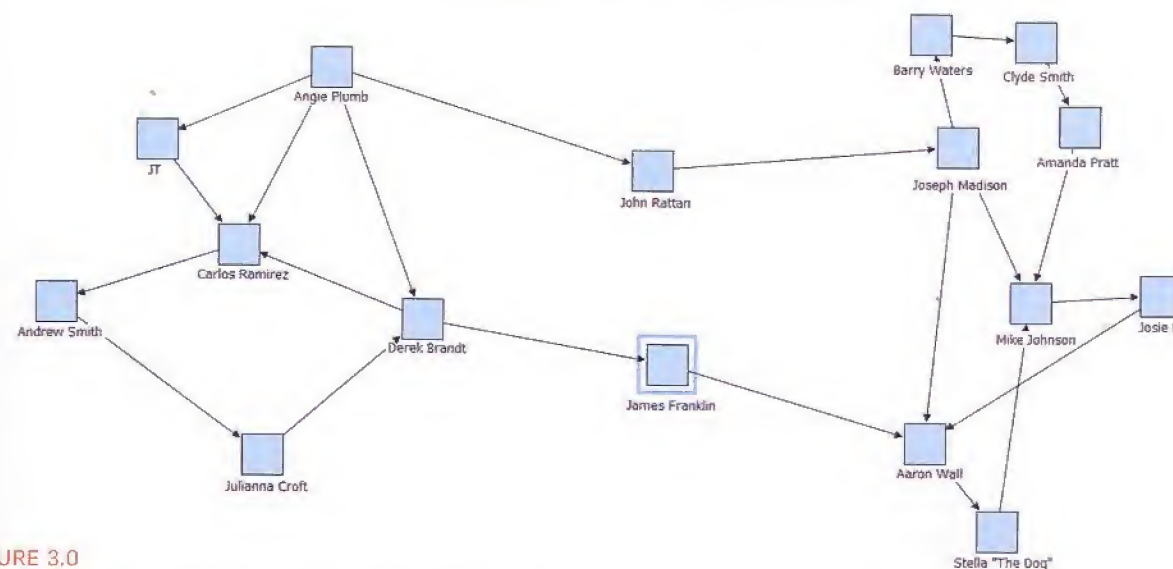


FIGURE 3.0
James Franklin and John Rattan have high betweenness scores—they are important conduits of information between the two groups

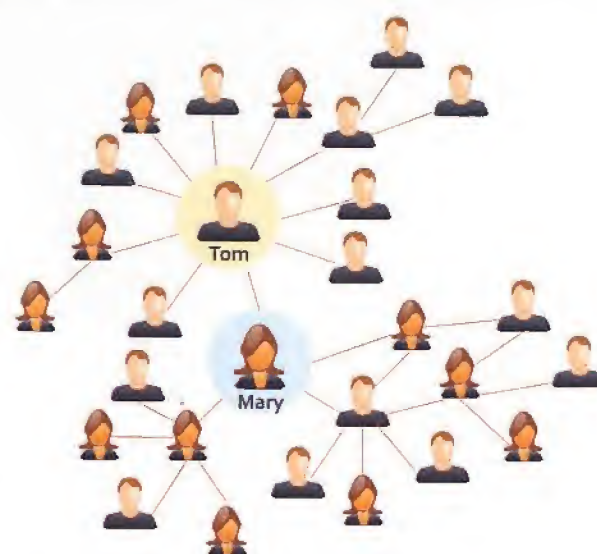


FIGURE 4.0
Note that although Tom has a larger number of direct connections, Mary is connected to other people who themselves have many connections. Therefore Mary is likely more highly placed in the network than Tom.

Using the Social Network Analysis module, investigators can quickly identify the key players in an organization and then focus their investigations on those individuals. SNA aids investigators in uncovering and defining hidden relationships that can provide opportunities to broaden the scope of the investigation and identify patterns that may help uncover communications that are not currently being intercepted.

INTELLEGO'S SOCIAL NETWORK ANALYSIS MODULE

Intellego automates the process of generating the social network analysis and graph. Each individual, website, e-mail address or target is represented as a **Node**. Each communication event that connects two nodes is represented as an **Edge**. Once the intercepted data is modeled in this format, the location of the nodes on the SNA diagram can be edited—either via automated layouts or manual dragging and dropping—to present a clear picture of the patterns of communication throughout the network. This allows the investigator to cut through the clutter and immediately visualize the relationships between the various targets.

Intellego provides several automated layouts to help present the diagram in the clearest way possible and to assist in deducing communication relationship information. The **hierarchical layout** establishes a hierarchy in the communications based on who communicates with whom. Based on how often people communicate, Intellego can determine who lies where in the hierarchy. This may provide key intelligence on where to focus the investigation. The **circular layout** will visually differentiate groups of nodes that communicate mostly internally and expose the outliers. This may indicate sub-groups that work semi-independently within a larger organization, for example a financing group and an operations group. Additionally, Intellego provides filters that allow an

investigator to focus only on a specific subset of the data, for example only suspect websites, to visualize just those elements. The **symmetric layout** visually depicts those nodes that are the most highly connected at the center of the diagram while placing nodes with only one or two connections (leaf nodes) at the edges of the diagram. This allows the user to immediately notice the important nodes in a diagram.

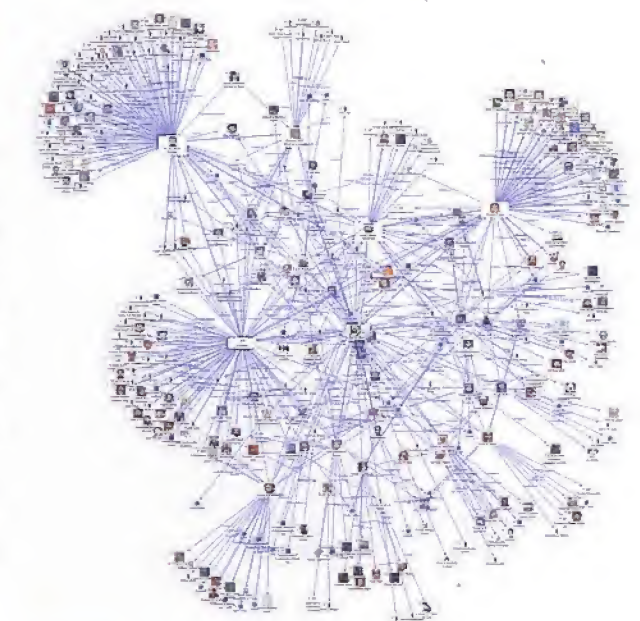


FIGURE 1.0
Complex Social Network Diagram in Symmetric Layout

From within the Social Network diagram, Intellego works seamlessly with Intellego's reconstruction module, which reconstructs Internet sessions and visualizes the target's Internet activity. This allows the user to drill down to the individual events that comprise a node or edge, and reconstruct those events individually to follow the exact same path as the target. By clicking on the edge, a list of communication events appears in the right hand portion of the screen. Clicking any individual event opens up a new window and displays the visual reconstruction of the communication.

ISLAND ANALYSIS

Intellego also provides investigators with the ability to perform Island Analysis. This allows the user to identify and locate isolated islands of communication that have no connection to the rest of the diagram. These "islands" of communications may highlight areas of the diagram that are not pertinent to the investigation, or possibly additional areas where further data is needed.

The Social Network Analysis module allows users to locate islands based on either the number of nodes in the island or the number of communication events. For example, criminals often exhibit a separate pattern of communication often use separate identities when conducting illicit business as opposed to normal Internet communications. The island analysis will help identify the ring of criminals associated with the illicit communications and help filter out the irrelevant material. Additional, criminal enterprises will often use disposable cell phones for their criminal Internet activity and only communicate with each other on those phones. The island analysis will quickly identify those isolated groups with no outside activity.

IMPROVED EFFICIENCY AND PRODUCTIVITY

When combined with Intellego's reconstruction module, Intellego's Social Network Analysis module significantly increases the productivity of investigators by eliminating the need to sift through mountains of irrelevant intercepted data and allowing them to focus on only the materials that are important to the case. Social Network Analysis helps the investigator identify the key players in a complex case – which often isn't the initial target of the monitoring – and with the use of the automated layouts, identify a hierarchy of individuals in the case all from the pattern of intercepted communications. Using these tools, Intellego allows investigators to expand the investigation to locate and apprehend people higher up in the criminal organization.

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